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PATENT ABSTRACTS OF JAPAN

(11)Publication number : 08-207119
(43)Date of publication of application : 13.08.1996

(51)Int.Cl. B29C 47/88
B29C 47/06
B29C 55/02
// B29K101:12
B29K105:16
B29L 7:00

IDS(3)

(21)Application number : 07-293570
(22)Date of filing : 17.10.1995

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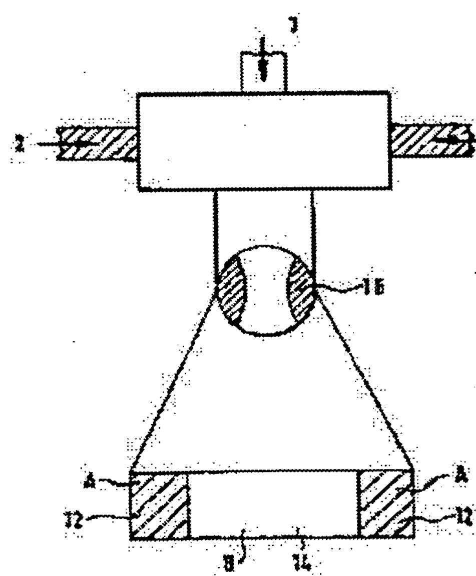
(30)Priority
Priority number : 06253789 Priority date : 19.10.1994 Priority country : JP

(54) PRODUCTION OF THERMOPLASTIC RESIN SHEET OR FILM

(57)Abstract:
PURPOSE: To reduce film manufacturing cost to a large extent by extruding a molten thermoplastic resin to a rotary cooling drum and further subjecting the extrudate to co-extrusion to obtain a non-oriented sheet having end parts and a central part clearly discriminated each other and uniaxially stretching the sheet to trim the end parts thereof.
CONSTITUTION: A molten thermoplastic resin is extruded to a rotary cooling drum in a sheet form to obtain a non-oriented sheet. A non-oriented sheet having end parts and a central part clearly discriminated each other is obtained by a double-side surface co-extrusion method. Next, the non-oriented sheet is stretched to obtain a film having a central part and end parts clearly discriminated each other and the end parts of this film are trimmed. Two or three or more extruders are used in co-extrusion. For example, a sleeve member 16 is rotated and a molten stream is emitted in a direction rotated by 90° from the sleeve member 16. In this case, a sheet wherein both end parts are composed of a polymer A12 and a central part is composed of a polymer B14 is subjected to co-extrusion.



LEGAL STATUS
[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

CLAIMS

[Claim(s)]
[Claim 1] (a) The process which extrudes heat-of-fusion plasticity resin in the shape of a sheet to revolution cooling drum lifting, and obtains a non-orientation sheet, (b) With the process concerned Or the process which extends the obtained non-orientation sheet to at least 1 shaft orientations, and obtains an oriented film, (c) Consist of the process which removes the edge of the obtained oriented film with trimming, and obtains a product film, and it sets at the aforementioned (a) process. The manufacture approach of of the thermoplastics sheet or film characterized by obtaining the non-orientation sheet which has the edge distinguished clearly and a center section by the co-extrusion.
[Claim 2] The manufacture approach according to claim 1 characterized by thermoplastics being one sort chosen from the group of polyethylene terephthalate (PET), polyethylene terephthalate-isophthalate (PETIP), polyethylenenaphthalate (PEN), and polyethylenenaphthalate-BIBENZOETO (PENBB), a polyether ether ketone (PEEK), polyethylene (PE), a polypropylene pin (PP), or Polly N-ether nitril (PN).
[Claim 3] The manufacture approach according to claim 1 or 2 extended on two shafts.
[Claim 4] The manufacture approach given in any of claims 1-3 they are that an edge contains cheap resin as compared with a center section.
[Claim 5] The manufacture approach according to claim 4 which is resin with which a center section contains a filler.
[Claim 6] The manufacture approach according to claim 1 which is intact resin with which a center section does not contain a filler.
[Claim 7] The manufacture approach according to claim 4 which is resin with which an edge contains a filler.
[Claim 8] The manufacture approach according to claim 4 which is intact resin with which an edge does not contain a filler.
[Claim 9] The manufacture approach according to claim 5 that an edge is resin with the same center section.
[Claim 10] The manufacture approach according to claim 6 that a center section is resin with the same edge.
[Claim 11] The manufacture approach according to claim 7 that a center section is resin with the same edge.
[Claim 12] The manufacture approach according to claim 8 that a center section is resin with the same edge.
[Claim 13] The manufacture approach according to claim 4 that a center section consists of PENBB and an edge consists of PEN.
[Claim 14] The manufacture approach according to claim 4 that consist of PET with a center section non-filling intact, and an edge consists of Playback PET.
[Claim 15] The manufacture approach according to claim 2 that an oriented film has the thickness of less than 2 microns.
[Claim 16] The approach according to claim 15 an oriented film has the thickness of less than 1 micron.

[Claim 17] The manufacture approach according to claim 4 which can recycle an edge.
[Claim 18] The thermoplastic film characterized by being manufactured by the approach of indicating to claim 1.
[Claim 19] The thermoplastic film characterized by being manufactured by the approach of indicating to claim 13.
[Claim 20] The manufacture approach according to claim 1 by which the both ends of 20% or less of width of face are constituted from thermoplastics of a center section to the width of face of the whole non-orientation sheet with thermoplastics with melting crystallization temperature low 5 degrees C or more, respectively.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] Especially this invention relates to the manufacture approach of the thermoplastic sheet by the coextrusion process, or a film about the manufacture approach of a thermoplastic sheet or a film. Although this invention is useful on especially the sheet or film that consists of an expensive polymer like PEN or PENBB, it is applicable also to the sheet or films which are not expensive ranks so much, such as PET.
[0002] Conventionally, the manufacture approach of a thermoplastic sheet or a film consists of the process which extrudes (a) heat-of-fusion plasticity resin in the shape of a sheet to revolution cooling drum lifting, and obtains a non-orientation (un-extending) sheet or the process concerned, and the process which removes the edge of the oriented film (c) (b) c Obtained with the process which extends the obtained non-orientation sheet to at least 1 shaft orientations, and obtains an oriented film with trimming, and obtains a product film. The above-mentioned drawing is performed in order to give useful physical properties to a film, and it is preferably extended by 2 shaft orientations.
[0003] Usually, a non-orientation sheet is first extended in a longitudinal direction, i.e., the direction in which a heat-of-fusion plasticity resin sheet is extruded to revolution cooling drum lifting. Typically, this drawing processing is performed by 2 sets of roller groups. Under the present circumstances, the roller group of the 2nd set is rotated from the roller group of the first set at high speed. A non-orientation sheet is extended by length 2 to 5 times the die length of extrusion by this processing. Subsequently, typically, the obtained uniaxial stretched film is extended in a longitudinal direction 2 to 5 times of extrusion width of face by tenter equipment (carrying out lateral spreading equipment).
[0004] Conventionally, irrespective of whether it is biaxial stretching or it is uniaxial stretching, a film edge is always removed by TORIMINIGU and let only a film center section be a product (goods). If possible, the trimmed edge is recycled and the tail which reaches 20% of the weight or more of a non-orientation sheet can be decreased. usually, the above-mentioned film -- a it top -- coating -- ****** -- it can be made the high product of added value by things.
[0005] However, when the coating agent on a film recycles the edge edge by which trimming clearance was carried out, mixing of the impurity which cannot be permitted while coloring a film yellow is caused. Therefore, the edge edge by which trimming was carried out is discarded, or must be used as a recycled product for which coloring and impurity mixing are not so important.
[0006] By the way, in case heat-of-fusion plasticity resin is extruded in the shape of a sheet to revolution cooling drum lifting and a non-orientation sheet is obtained, the so-called necking arises and, thereby, the edge where thickness is large is formed as compared with a sheet and a film center section. Although it is cooled quickly and the closing-in section of the center of a sheet maintains a non-orientation (amorphism) condition, since it is cooled slowly, it is easy to crystallize a thick edge. Moreover, the clamp which holds and extends a film with tenter equipment when carrying out orientation of the uniaxial stretched film gives an uneven cross-section configuration to a film edge. For this reason, orientation processing is not performed in contrast with a film center section by the film part held by the clamp. Therefore, **** of a film

may happen during manufacture for change of the cross-section configuration which originates in a difference of the orientation condition of the trimming edge and center section of the film, and the rate of crystallization.

[0007] In the conventional film manufacture approach, since thickness and a crystalline change occur selectively among the above film edges, less than 2 microns especially of manufactures of a less than 1-micron very thin film are difficult. As everyone knows, the more a film is thin, the more it brings a result which raises a manufacturing cost while it ******-comes to be easy and it causes trouble to manufacture. Furthermore, although need is growing in the field of a capacitor film, in this field, especially as for these ultra-thin films, a capacitor more useful as film thickness is thin is obtained now.

[0008] The biaxially oriented film is used in many fields, such as a capacitor film, a photographic film, a copy film, a magnetic tape base material, an ornament film, and a package film. In the case of an uniaxial stretched film, when extended by the longitudinal direction (TD) with a lengthwise direction (LD) or tenter equipment, it is made into useful films, such as a shrink film usually used in the package field, or adhesive tape, for example.

[0009] Usually, heat setting processing is performed by a film's regulating after a drawing and size and holding under the elevated temperature below the melting temperature of a polymer. A film is fully crystallized by this processing to extent which can fix a physical characteristic. In the case of manufacture of a shrink film, when not performing heat setting processing or giving, a low-temperature heat setting is applied.

[0010] Moreover, although a thermoplastics film is used for a broad application as above-mentioned and it is an indispensable ingredient in current industry, the application which needs the film which has advanced thermal resistance increases, and the elevated temperature of a film and advanced dimensional stability are demanded especially recently. Moreover, the film with which the waist does not become weak in a very thin film and which has a big elastic modulus is needed like strongly [the demand about high-intensity-izing]. In order to satisfy high thermal resistance and reinforcement simultaneously, the melting point is high and the approach of using as the film which used the thermoplastics which has high crystallinity and carried out biaxial orientation to altitude is effective.

[0011] Since it has with polyester film and sufficient balance [property / of various kinds / film / polyethylene terephthalate (PET) / above all, such as a mechanical property, chemical property, and electrical characteristics,] and excels in respect of cost performance also in current and the thermoplastic film currently used widely, it is widely used as industrial materials. However, to the latest high thermal resistance and want of high-intensity-izing, it cannot necessarily say that a PET film is enough, but is anxious for the film which used the thermoplastics of further high-melting and high crystallinity.

[0012] In order to meet the above-mentioned demand, the biaxially oriented film of polyphenylene sulfide (PPS), a polyether ether ketone (PEEK), and polycyclohexylene dimethylene terephthalate (PCT) etc. is proposed. And in addition to these, the polymer of further high crystallinity is used and the attempt which improves thermal resistance is also performed. However, if the crystallinity of a polymer is too high, in the case of manufacture of the biaxially oriented film which used it, there is a trouble on the manufacture generated from high crystallinity which is explained below, and it has been a failure to implementation of high thermal resistance.

[0013] In case solution quenches a melting polymer and manufactures the non-extended sheet of amorphous state as one of the difficult things among the troubles which high crystallinity brings about, the phenomenon said that a polymer crystallizes with the lack of cooling is mentioned. Although especially this crystallization tends to take place to the edge of a melting sheet, the reason is because the edge is thick. When a sheet edge crystallizes, fracture of a film occurs frequently at the drawing process of the lengthwise direction performed succeedingly, and big lowering of productivity is caused.

[0014] In case a melting sheet is quenched and a non-crystallized sheet is obtained conventionally, electrostatic impression contact printing is used in order raise the adhesion between a melting polymer and a revolution cooling drum, to raise cooling effectiveness and to

obtain the good sheet of smoothness. Furthermore, in the case of the crystalline high polymer, in addition to this electrostatic impression contact printing, liquid spreading contact printing is proposed.
[0015] the direction which usually intersects perpendicularly with the flow of a sheet with the above-mentioned electrostatic impression contact printing at the top-face side of a sheet -- a line -- it is the approach of installing an electrode or a blade-like electrode, giving electrostatic charge to a sheet by impressing the direct current voltage of about 5-10kV to the electrode concerned, and raising adhesion with a revolution cooling drum. Moreover, the above-mentioned liquid spreading contact printing is the approach of raising the adhesion of a revolution cooling drum and a sheet by applying to homogeneity the medium which raises the adhesion of oil, a solvent, etc. to the whole revolution cooling drum front face or a part (for example, only part in contact with sheet both ends).
[0016] Although it has effectiveness as it is, when a high crystalline polymer is used so that the above-mentioned all directions method may meet the latest demand of high thermal resistance, especially the thing for which crystallization of a part with a thick sheet edge is prevented thoroughly is still difficult the method. Therefore, it becomes possible by solving this technical problem to obtain the film which improved thermal resistance by leaps and bounds.
[0017]
[Problem(s) to be Solved by the Invention] This invention is made in view of the above-mentioned actual condition, and the object is in offering the peculiar and new manufacture approach of the thermoplastics sheet with which the fault of the above-mentioned conventional method was solved, a manufacturing cost and the cost of the film manufacture which uses an expensive polymer especially were substantially reduced, and the workability of the film under manufacture and after manufacture was moreover improved substantially, or a film. Moreover, in the process which manufactures the non-crystallized sheet of thermoplastics with a quick crystallization rate, by preventing crystallization of an edge, other objects of this invention prevent problems, such as fracture at the process which carries out drawing processing of the sheet concerned, and are to offer the manufacture approach of of the crystalline thermoplastics sheet or film which can raise productivity.
[0018]
[Means for Solving the Problem] Namely, the process which the summary of this invention extrudes (a) heat-of-fusion plasticity resin in the shape of a sheet to revolution cooling drum lifting, and obtains a non-orientation sheet, (b) With the process concerned Or the process which extends the obtained non-orientation sheet to at least 1 shaft orientations, and obtains an oriented film, (c) Consist of the process which removes the edge of the obtained oriented film with trimming, and obtains a product film, and it sets at the aforementioned (a) process. It consists in the manufacture approach of of the thermoplastics sheet or film characterized by obtaining the non-orientation sheet which has the edge distinguished clearly and a center section by the co-extrusion.
[0019] And especially, in the desirable embodiment of this invention, in order to manufacture a crystalline thermoplastics sheet or a film, the both ends of 20% or less of width of face are constituted from the thermoplastics of a center section to the width of face of the whole non-orientation sheet by thermoplastics with melting crystallization temperature low 5 degrees C or more, respectively.
[0020]
[Embodiment of the Invention] Hereafter, this invention is explained to a detail. The manufacture approach of of the thermoplastics sheet or the film which consists of the process which extrudes (a) heat-of-fusion plasticity resin in this invention in the shape of a sheet to revolution cooling drum lifting, and obtains a non-orientation sheet or the process concerned, and the process which removes the edge of the oriented film (c) (b) c Obtained with the process which extends the obtained non-orientation sheet to at least 1 shaft orientations, and obtains an oriented film with trimming, and obtain a product film is well-known in itself.
[0021] In this invention, nitril, such as olefins, such as the (Polyethylene PE) polypropylene (PP) polybutylene (PB) Polly 3-methylbutene -1 (PMB), and the Pori-ether nitril (PN), is used as

thermoplastics. [besides polyphenylene sulfide (PPS) polyether ether ketone (PEEK), polyethylenenaphthalate (PEN), and polyethylenenaphthalate-BIBENZOETO (PENBB), polyethylene terephthalate (PET), and polyethylene terephthalate-isophthalate (PETIP)]
[0022] As one of the desirable embodiments, crystallinity carries out melting extrusion of the high thermoplastics, and this invention includes the approach of carrying out quenching solidification of the melting sheet obtained, and manufacturing a non-crystallized sheet. And when manufacturing a crystalline thermoplastics sheet or a film according to this desirable embodiment, as crystalline high thermoplastics, crystalline polyolefines, such as PMB besides polyester, PPS, and PEEK, PEEK, a polyether ketone, PN, etc. are used suitably, for example. In these, in the case of polyester, the effectiveness by the manufacturing method of this invention is remarkable so that it may explain below.
[0023] That is, in the process which in the case of polyester extrudes heat-of-fusion plasticity resin in the shape of a sheet to revolution cooling drum lifting, and obtains a non-orientation sheet, although electrostatic seal-of-approval contact printing mentioned above is usually effectively employable, it is difficult to be unable to give charges enough to a sheet edge, but for cooling of a sheet edge to be insufficient, and to fully make it amorphous state for the reasons of the discharge to a revolution cooling drum from an electrode tending to take place. Although liquid spreading contact printing is proposed, since the thing with the very flat front face mentioned above in order to solve this problem is required like in the case of polyester film, the effect of the applied liquid may pose a problem.
[0024] Moreover, in order to obtain the film of high intensity in the case of polyester, when it is necessary to extend a high scale factor and crystallization has taken place in the phase of a non-orientation (un-extending) sheet, the problem of fracturing at the time of a drawing occurs. Therefore, in the case of polyester, the new method of preventing crystallization of a sheet edge is demanded strongly.
[0025] Moreover, in the case of polyester, it is possible by carrying out suitable amount copolymerization of other components to reduce crystallinity. When the co-extrusion of the copolymerization polymer made into low crystallinity by this copolymerization method is carried out and a sheet edge is made to form, since the fluidity of a melting polymer is almost the same, it can perform easily that control of flow makes only a sheet edge occupy the above-mentioned copolymerization polymer easily consequently. Furthermore, in the case of polyester, since compatibility with the above-mentioned copolymerization polymer is good, when only a sheet edge is made to occupy a copolymerization polymer, it is advantageous also at the point which problems, such as interfacial peeling, cannot produce easily.
[0026] The polyester said by this invention is polyester obtained considering aromatic series dicarboxylic acid, or its ester and glycol as a main start raw material. As an aromatic series dicarboxylic acid component, terephthalic-acid, 2, 6-naphthalene dicarboxylic acid, 4, and 4'-diphenyl dicarboxylic acid etc. is mentioned. As a glycol component, ethylene glycol, 1,4-butanediol, 1, and 4-cyclohexane dimethanol etc. is mentioned.
[0027] Especially when obtaining the polyester of low crystallinity, other aromatic series dicarboxylic acid components and glycol components can be used together. As an aromatic series dicarboxylic acid component used together, isophthalic acid, a phthalic acid, an adipic acid, a sebacic acid, hydroxy acid (for example, p-oxyethoxy benzoic acid etc.), etc. are mentioned. As a glycol component used together, a diethylene glycol, triethylene glycol, propylene glycol, neopentyl glycol, etc. are mentioned, for example. These may use two or more sorts of ****.
[0028] The effectiveness by the desirable embodiment which this invention described above is notably demonstrated, when deltaTmc measured by the approach of mentioning later is crystalline thermoplastics which is less than 50 degrees C. The reason is as follows.
[0029] Although very advanced thermal resistance is expected when the above high crystallinity thermoplastics is used as an oriented film, it is difficult to manufacture a film with sufficient productivity according to the problem of crystallization mentioned above by the conventional manufacture approach. If cooling effectiveness falls at the process which quenches a melting sheet especially when deltaTmc is crystalline thermoplastics which is less than 50 degrees C, time amount until the temperature of melting resin turns into below crystallization temperature

will become long, and crystallization will be caused. Therefore, as long as the conventional cooling approach is used, it is very difficult for deltaTmc to prevent crystallization thoroughly to a sheet edge the crystalline thermoplastics case which is especially less than 40 degrees C less than 50 degrees C.

[0030] In order to prevent the above-mentioned crystallization, the co-extrusion of the resin of low crystallinity is carried out, and the both ends of a sheet are made to form rather than the resin for sheet center sections in this invention. 5 degrees C or more of 10 degrees C or more of extent with the low heat-of-fusion crystallization temperature (Tc) over the resin for center sections of low crystalline polymer (resin for both ends) are 20 degrees C or more still more preferably preferably. Less than 5 degrees C of the effectiveness of crystallization prevention according [the difference of Tc of the resin for both ends and Tc of the resin for center sections] to the manufacture approach of this invention are insufficient. On the other hand, even if the difference of Tc is too large, it does not become a problem at all. By the way, although a crystallization peak [in / in the resin for both ends / DSC measurement] may not be acquired amorphism nature or since it is low crystallinity very much, it considers in this case that the difference of Tc is size, and is contained in the above-mentioned definition in this invention.

[0031] Moreover, in this invention, in order to make crystallization prevention easy, it is desirable that deltaTmc of the resin for both ends is especially larger than deltaTmc of the resin for center sections 20 degrees C or more 10 degrees C or more.

[0032] Moreover, in this invention, the resin for both ends needs the compatibility in an interface with the resin for center sections. Therefore, as for the resin for both ends, it is desirable that it is similar with it of the resin for center sections in respect of polymer structure. Because, when the resin of a center section and both ends consists of a completely different component, there are problems, like exfoliation by the interface takes place. Moreover, the suitable drawing conditions of each resin differ, consequently at the time of a drawing, crystallization may take place or partial adhesion may take place between drawing rolls.

[0033] Then, in this invention, the low crystalline polymer containing the component of the resin for center sections is usually used as resin for both ends. the component which constitutes the resin for center sections as low crystalline polymer — more than 50 mol % — it is desirable that it is resin to contain. As an approach of making the resin for both ends containing the above-mentioned constituent, any of the approach of using a copolymer for the resin for both ends and the approach of blending the resin for center sections to the resin for both ends are sufficient.

[0034] Moreover, in this invention, it is desirable in the melting extrusion temperature from a viewpoint of the pour stability after the polymer unification at the time of co-extrusion that there is no difference in each melt viscosity of the resin for both ends and the resin for center sections. Usually, although the melt viscosity of a polymer is dependent on a shear rate, as for the melt viscosity of the resin for both ends, it is desirable that there are no melt viscosity and difference of the resin for center sections in the large shear rate range.

[0035] In order to make it the problem of the resin streak from the polymer unification section to a dice part, for example, problems, like the resin for both ends flows into a center section, not arise especially, it is desirable that the range of the melt viscosity ratio (resin / resin for both ends for center sections) under the conditions of the shear rate 100 (1-/second) in melting extrusion temperature is 0.5-3.0. 0.8-2.0, and especially the desirable range of the still more desirable range of the above-mentioned melt viscosity ratio are 1.0-1.5. When exceeding the case where a melt viscosity ratio is less than 0.5, and 3.0, low crystalline polymer flows in not only inside both ends but inside a sheet, and causes trouble to the manufacture of a high heatproof film made into the object.

[0036] Usually, the resin for center sections differs from the melting point, and, as for the resin for both ends, for this reason, the optimum ranges of melting extrusion temperature differ. Specifically, the temperature from an extruder to near the unification section differs in many cases. However, after unification is usually extruded at the almost same temperature. In addition, the melting extrusion temperature which obtains the above-mentioned melt viscosity ratio points out the extrusion temperature after the above-mentioned unification.

[0037] In this invention, in order to raise the slipping nature of the film obtained, to give and deal

with blocking resistance and to make a sex good, it is desirable to make the resin for center sections at least contain a particle.
[0038] The mean particle diameter of the above-mentioned particle is usually chosen from the range of 0.01-10 micrometers. When mean particle diameter is too small, the slipping nature of a film runs short, and when mean particle diameter is too large, the debasement by surface roughening with a remarkable front face is caused. The range where mean particle diameter is desirable is chosen according to the surface characteristic demanded according to the thickness and the application of a film. For example, in the case of the biaxial oriented film used as a base film for magnetic-recording media, 0.01-3 micrometers of mean particle diameter are usually 0.02-2 micrometers preferably. Moreover, in the case of an industrial use biaxial oriented film with a thickness of 15 micrometers or less, 0.02-5 micrometers of mean particle diameter are usually 0.02-3 micrometers preferably.
[0039] The number of the particles to be used one and two or more kinds are sufficient as them. What is necessary is just to have satisfied the range which the mean particle diameter of at least one sort of particles in it described above, when using two or more kinds of particles.
[0040] As the above-mentioned particle, organic particles, such as inorganic particles, such as a calcium carbonate, calcium phosphate, a silica, a kaolin, talc, a titanium dioxide, an alumina, a barium sulfate, a calcium fluoride, lithium fluoride, a zeolite, and a molybdenum sulfide, a crosslinked polymer, and a calcium oxalate, are mentioned, for example. The particle classified after grinding a crosslinked polymer which was indicated by JP,59-5216,B, for example as a crosslinked polymer particle, and a crosslinked polymer particle spherical on a real target can be mentioned.
[0041] As an approach of adding a particle, the approach of adding at the production process or melting extrusion process of thermoplastics is mentioned into thermoplastics. And you may add as a desiccation particle (particle independent), or a particle may make a suitable medium distribute a particle and may be added as a slurry. When adding a particle at a melting extrusion process, it is desirable to use a twin screw extruder as an extruder from a viewpoint of the dispersibility of a particle.
[0042] Even if the approaches of adding a desiccation particle are condensation polymers, such as polyester, since polymerization-degree lowering of a polymer is small, the advantage said that extrusion becomes easy is mentioned. The advantage said that the dispersibility of a particle is good easy [control of an addition] for the approach of adding a particle slurry is mentioned. As a preparation solvent of a slurry, water or the organic solvent of 200 degrees C or less of boiling points is desirable. Ethylene glycol etc. is mentioned as this organic solvent. Moreover, in the approach of adding a particle slurry, it is required to use the twin screw extruder which has one or more vent-ports, to make at least one of them reduced pressure, and to remove a solvent.
[0043] Moreover, as a particle which can be made to contain in a polyester raw material especially, the deposit particle made to generate at the time of a polymerization besides the above-mentioned particle can be mentioned. The deposit particle said here points out the particle which deposited the alkali metal or the alkaline-earth-metal compound added as a catalyst within the system of reaction at the time of polyester manufacture. In this case, the amount and particle size of a particle can be adjusted by making more than a kind of phosphorus compounds exist in the system of reaction.
[0044] First, in this invention, the process (a) which extrudes heat-of-fusion plasticity resin in the shape of a sheet to revolution cooling drum lifting, and obtains a non-orientation sheet is performed. And this invention is characterized by obtaining the non-orientation sheet which has the edge distinguished clearly and a center section by the both-sides side co-extruding method. And by extending this non-orientation sheet, as shown in drawing 1 , the film which has the center section distinguished clearly and an edge is obtained. Drawing 1 is the cross-section explanatory view of the thermoplastics film which has the thick edge manufactured by the method of co-extruding this invention, A part expresses the edge of a film among drawing, and B part expresses the center section of the film. As for the above-mentioned non-orientation sheet edge, it is desirable to form with a cheap ingredient as compared with a center section.
[0045] In addition, in drawing 1 , the polymer cross section 10 has the center section 14 which

connects two edges 12 and these which are shown in a triangular cross-section configuration. However, in this invention, the cross-section configuration of an edge is not important, and, so, the edge concerned can be formed in cross-section configurations, such as a rectangle, circular, a square, and a tapering form. The polymer B which forms the polymer A which forms an edge, and a center section does not need to be the same type like polyester, or the same kind, as long as the condition that these fully joined together mutually through the production process of a thermoplastic sheet or a film at large can be held. However, it is important that these polymers have extension or drawing temperature (this usually means that less than 20 degrees C of glass transition temperature Tg of a mutual polymer are preferably close to less than 10 degrees C) of similar melt viscosity and resemblance as mentioned above.

[0046] The above-mentioned co-extrusion is performed by supplying each polymer which constitutes the center section and both ends of a sheet or a film to co-extrusion equipment. That is, use two sets or three sets or more of extruders, for example, each melting polymer is made to join a predetermined configuration with a lamination feed block, and it extrudes as a melting sheet from a slit-like mouthpiece. By this co-extruding method, two or more polymer melting styles are formed, and the non-orientation sheet which has the center section distinguished clearly and an edge is obtained. In this case, the die specifically called the conventional die or conventional A-B-A mold die which has single opening with a lamination feed block is used.

[0047] Drawing 2 is approximate account drawing of the conventional extrusion system which has the pivotable sleeve object (pinole) 16 and which manufactures a layered product by the co-extruding method, and is a drawing for making an understanding of this invention easy. In drawing 2 , the conventional extruders 1 and 2 of the couple for extruding Polymer A and Polymer B are shown by the schematic diagram. Typically, a different polymer is extruded through a lamination feed block, and the lamination of the configuration of having been illustrated which covered most both sides of Polymer B with Polymer A like is formed. Polymer B is extruded through the center section of the feed block from an extruder 1, and another side and Polymer A are extruded through the upper part and the lower part of a feed block from an extruder 2. A melting polymer is extruded through an extruding die, after circulating the sleeve object 16 from a feed block. The extrusion system of a configuration is used for manufacture of the film typically known as an A-B-A mold lamination conventionally [this].

[0048] Drawing 3 is approximate account drawing of the same extrusion system as the conventional extrusion system except having rotated the sleeve object 16 90 degrees, in order to manufacture the film of this invention. That is, drawing 3 shows the same equipment as drawing 2 except carrying out the regurgitation in the direction which the sleeve object 16 rotated and the melting style from the sleeve object 16 rotated 90 degrees. In this case, the co-extrusion of the sheet with which both ends consist of polymer A (12), and a center section consists of polymer B (14) is carried out so that it may illustrate. In this embodiment, the same die as the conventional die used by the extrusion system of drawing 2 , i.e., the die which has a single rectangle dice lot, is used as a die.

[0049] Drawing 4 is the partial flat-surface explanatory view of three conventional dies juxtaposed in order to manufacture the film of this invention using different equipment from drawing 3 , and is a drawing in which an another means to manufacture the thermoplastic sheet or film of this invention is shown. The die 18 of three juxtaposed conventional types is shown by drawing 4 . In this case, in order to form an A-B-A mold co-extrusion film, both ends 12 consist of Polymer A, and the polymer B extruded from another side and a center section 14 consists of an ingredient of a different kind.

[0050] In short, the A-B-A mold co-extrusion thermoplasticity sheet or film of this invention The lamination equipment of the former which has (1) extruder, a lamination feed block, and an extruding die like mentioned above is used. How to only rotate a melting style only 90 degrees as drawing 3 shows, Or it is the approach of juxtaposing a (2) 3 ** extruding die and extruding two sorts of different polymers, and as shown in drawing 4 , it can manufacture by the approach of supplying the first polymer to both ends and supplying other polymers to a film center section etc.

[0051] Moreover, in this invention, a laminated structure may be formed in a center section in the case of the above-mentioned co-extrusion. For example, in order to make a laminated structure form in a center section, the approach of using two sets of extruders for the extrusion of the polymer of a center section three sets of inside, and using one set of the remaining extruder for the extrusion of the polymer of both ends may be adopted.
[0052] In this invention, quenching solidification of the melting sheet extruded from the die by revolution cooling drum lifting is carried out so that it may become the temperature below glass transition temperature, and the non-orientation sheet of amorphous state is obtained substantially. In this case, in order to raise the smoothness of a sheet, it is desirable to raise the adhesion of a sheet and a revolution cooling drum, and electrostatic impression contact printing or liquid spreading contact printing is preferably adopted in this invention. In this invention, both may be used together if needed.
[0053] When manufacturing a crystalline thermoplastics sheet or a film according to the desirable embodiment of this invention especially, the extrusion outlet of the resin which constitutes a center section, and the resin which constitutes both ends is adjusted with quantum feeders, such as each gear pump, and it is controlled so that crystalline low resin becomes within the limits of 20% of edges to sheet width of face. When crystalline low resin mixes in a sheet inside part, the product yield cannot fall and a film high crystalline [which is one of the objects of this invention], and high heat-resistant cannot be manufactured efficiently. as for the resin for both ends, it is desirable to make it 10% or less of edges to sheet width of face, and it makes it 5% or less — it is still more desirable.
[0054] Next, in this invention, in order to manufacture a thermoplastic film, the process (b) which extends the obtained non-orientation sheet to at least 1 shaft orientations, and obtains an oriented film, and the process (c) which removes the edge of the obtained oriented film with trimming, and obtains a product film are performed. That is, in this invention, especially the non-orientation sheet manufactured as mentioned above is extended to 2 shaft orientations, and the high oriented film of added value is manufactured.
[0055] Manufacture of a biaxial-stretching (orientation) film can be performed as follows. First, a non-extended sheet is extended to 1 shaft orientations with the drawing machine of a roll or a tenter method. the case where glass transition temperature of a polymer is set to Tg (degree C) — the above-mentioned drawing temperature — usually (Tg-10) -(Tg+50) ** — it is preferably chosen from the range of -(Tg-5) (Tg+30) **, and the above-mentioned draw magnification is usually preferably chosen from the 3.0 to 6.0 times as many range as this 2.0 to 7.0 times.
[0056] Subsequently, it extends in the direction which intersects perpendicularly with the first step. in this case, drawing temperature — usually (Tg-5) -(Tg+60) ** — it is preferably chosen from the range of Tg - (Tg+50) **, and draw magnification is usually preferably chosen from the 3.5 to 6.0 times as many range as this 2.5 to 7.0 times. In addition, the approach of extending 1 shaft orientations in two or more steps is also employable. It is desirable that draw magnification final also in that case is above-mentioned within the limits. Moreover, it is also possible to carry out biaxial stretching of the non-extended sheet simultaneously so that an area scale factor may increase 10 to 40 times.
[0057] In this invention, the obtained film is usually heat-treated for [1 second -] 5 minutes at the temperature of 100-280 degrees C under the condition under less than 30% of expanding, limit contraction, or fixed-length. After carrying out biaxial stretching, a re-drawing is further performed to a lengthwise direction 1.05 to 2.5 times, and the approach of heat-treating after that can also be adopted. Under the present circumstances, technique, such as front [a re-length drawing] heat setting, after [a re-length drawing] length relaxation, and a front [a re-length drawing] (or after) minute scale-factor length drawing, can be adopted suitably. Moreover, a re-drawing may be similarly performed in a longitudinal direction. Moreover, various kinds of surface treatment etc. may be performed within a film production process if needed.
[0058] Moreover, in order to give various kinds of properties, such as easy adhesiveness, antistatic nature, a mold-release characteristic, thermal resistance, and smoothability, a spreading layer can be prepared in the front face of the obtained film. The spreading layer concerned may be prepared at which (after film manufacture) process within a film production

process and besides a process. The approach of establishing from the homogeneity of spreading thickness or a viewpoint of productive efficiency, before going into a horizontal drawing process after the lengthwise direction drawing of a film production process is desirable.
[0059] As an example of the paint, a copolymer, a mixture, etc. of resin, such as polyester, a polyamide, polystyrene, polyacrylate, a polycarbonate, polyarylate, a polyvinyl chloride, a polyvinylidene chloride, a polyvinyl butyral, polyvinyl alcohol, and polyurethane, and these resin can be mentioned. In addition, additives, such as an antioxidant, a thermostabilizer, lubricant, an antistatic agent, a color, and a pigment, may be blended with the thermoplastics resin used by this invention if needed.
[0060] Next, in this invention, the process (c) which removes the edge of the obtained oriented film with trimming, and obtains a product film is performed. This process is conventionally performed according to a well-known approach. In addition, this process is applicable also to manufacture of the thermoplastics sheet of this invention.
[0061] When it recycles a trimming edge, the polymer used for the trimming edge concerned may be the same as the polymer used for a center section. on the other hand, the polymer which cannot recycle a trimming edge, or is used for a trimming edge when it can recycle for a cheaper product — a center-section polymer and compatibility (compatibility) — it is — rather than — a cheap polymer — using it — things — being desirable .
[0062] Next, some embodiments in the manufacture approach of this invention are explained. However, these embodiments do not limit this invention at all. In addition, in this invention, the thermoplastics of a raw material is used if needed as the restoration polymer which added the above-mentioned addition particle (filler), or a non-filled up polymer which is not added.
[0063] (1) the case where a PENBB film is manufactured — as the polymer of a trimming edge -- **** — cheap PEN can be used. This embodiment is suitable for especially manufacture of the ultra-thin PENBB film used as for example, a capacitor film.
[0064] (2) As other applications, manufacture of the PET film in a magnetic field is mentioned. While a restoration film is uniform and a filler is uniformly distributed over the interior of the film itself in this field, it is important that a cross-section configuration is uniform. In this case, it is more desirable to form the edge of a film with an intact non-filling PET film. In this example, the manufacturing cost of a restoration film permissible in the magnetic film field becomes more expensive as compared with the manufacturing cost of an intact non-filling PET film. Furthermore, the edge which consists of an intact PET film is recyclable.
[0065] (3) In the application of further others, it is desirable to use most or the polymer which does not contain a filler at all for a film center section, and to use the polymer which carried out high restoration of the filler for a trimming edge. In this case, it is not [which the filler contained in it about the polymer used for a trimming edge is a state of aggregation, or is demanded in a magnetic field] important whether homogeneity distribution is carried out like. In this case, the edge which contains a cheap filler inside can manufacture more cheaply than a center-section polymer. therefore, the film of this invention — the center section — restoration or non-filling any — you may be — moreover, a film edge — a request — restoration — or suppose that it is non-filling.
[0066] (4) A film center section can be made to be able to contain a filler required for a final product further again, and another side and a film edge can also be made to fill up with a cheaper filler of a different kind. As a suitable filler in this case, inorganic filler particles, such as the organic filler particle which consists of viaduct consistency polymers, such as an acrylic polymer or a copolymer, an olefin polymer or a copolymer, a polyester polymer, or a copolymer, a silica, an alumina, a calcium carbonate, a titanium dioxide, and clay, or two or more sorts of such combination are mentioned.
[0067] (5) A film manufacturing cost can also be reduced by similarly, forming a film center section from an intact polymer, and forming another side and a film edge from playback or a recycle polymer. When the coating which it fills up with a film center section, and makes recycle impossible must be prepared, it is [/ that it must be discarded eventually] cheap as much as possible as a polymer for both ends, and it is desirable to use the polymer which has compatibility.

[0068] For example, when manufacturing the polyester film covered with vinylidene barrier coating, a trimming edge is good to form from the polyester which carried out high restoration of a cheap silica and a cheap calcium carbonate, or to form from other cheap polymers like recycle or a playback polymer. In the case of vinylidene coat polyester film, since it is not usually recyclable, the reason is for having to discard all trimming edges.
[0069] However, it is important that there are [a polymer of an edge] a polymer of a center section and compatibility. That is, when the co-extrusion of the polymer which forms an edge and a center section is carried out, it needs to have sufficient bonding strength (chemical compatibility) for being equal to drawing processing. Similarly, these polymers need to have similar melt viscosity (that to which the viscosity number approached less than two preferably less than three), and the similar glass transition temperature Tg (what approached less than 10 degrees C preferably less than 20 degrees C mutually).
[0070] Also in which the above-mentioned embodiment [whether a film is extended by 1 shaft orientations (a lengthwise direction (LD) or which direction of a longitudinal direction (TD)), and] [whether it is extended by 2 shaft orientations (LD / the direction of TD, or TD/the direction of LD), and] or width or a lengthwise direction — a re-drawing (LD/TD/LD or the direction of TD/LD/TD —) It is not [LD/TD / being TD or being the direction of TD/LD/LD, and] important whether it is carried out, such as LD/TD/LD/TD or direction etc. of TD/LD/TD/LD, and they can apply the conventionally well-known various drawing approaches mentioned above.
[0071] Moreover, also in which the above-mentioned embodiment, coating may be performed to the appearance mentioned above on the surface of a film to which timing under [before drawing processing] drawing processing or after drawing processing. That is, the thermoplastic films in this invention may be any of a coat film or a non-covered film.
[0072]
[Example] Although an example is given and this invention is hereafter explained further to a detail, this invention is not limited by the following examples unless the summary is exceeded. In addition, the measuring method of the various physical properties in an example and a property and the definition are as follows. the inside of an example and the example of a comparison — "the section" — a certain ** "the weight section" is shown.
[0073] (1) SV (solution viscosity for the determination of molecular weight of polyester)
The 1-% of the weight dichloroacetic acid solution of a sample polymer was prepared, and the viscosity (runoff time amount) was measured in 25 degrees C using the capillary viscometer. The SV value was calculated using the degree type. The inside of a formula and t are the exit velocity of the solution in the concentration of 1 g/dl, and t0. It is the runoff time amount of only dichloroacetic acid.
[0074]
[Equation 1] $SV=[(t/t0) -1] \times 1000$[0075] (2) Particle size of 50% of addition volume fractions in equivalence globular form distribution measured with the mean-particle-diameter centrifugation type particle-size-distribution measuring device (the "SA-CP3 mold" by Shimadzu) of a particle was made into mean particle diameter (d50).
[0076] (3) It measured with melting crystallization temperature and DSC[by deltaTmc PerkinElmer, Inc.]-7 mold. That is, polymer sample about 10mg was set in DSC equipment, and carried out temperature up the rate for 10-degree-C/from the room temperature. After the endoergic peak based on melting of a polymer was acquired, temperature up was carried out to temperature higher 40 more degrees C than the peak temperature (Tm (degree C)) concerned, and the melting condition was held for 5 minutes at the temperature. Then, the temperature was lowered the rate for 10-degree-C/. At the time of a temperature fall, the exothermic peak based on crystallization of a polymer was obtained. The exothermic peak temperature concerned was made into melting crystallization temperature (Tc (degree C)). The difference (Tm-Tc) of Tm and Tc which were obtained was set to deltaTmc (degree C).
[0077] (4) It measured by flow tester CFT[by melt viscosity Shimadzu]-500A. The nozzle with a bore [of 1mm] and a die length of 10mm was used, and five or more points and a load were changed and measured. The melt viscosity value at the time of a shear rate 100 (1-/second) was read in the curve which shows the flowability of the polymer which plotted the relation between

a shear rate and melt viscosity, and was obtained.
[0078] The PET film which has an example 1 non-filling edge and a restoration center section was manufactured conventionally which rotated the sleeve object 90 degrees using the laminate film equipment of a type, as drawing 3 showed. various film thickness, film width, and cross-section configurations of an edge are boiled, were changed, the film was manufactured, and it asked for weight % of a trimming edge to the film whole quantity by count about each. A result is shown in a table 1.
[0079]
[A table 1]

フイルム		トリミング端部		フイルム全量に対するトリミング端部の重量%
厚さ（μm）	幅（m）	幅（cm）	高さ（μm）	
1	4	30	200	95
2	4	30	200	90
5	4	30	200	78
1	8	30	200	89
2	8	30	200	80
5	8	30	200	62
1	4	30	50	81
2	4	30	50	69
5	4	30	50	47
1	8	30	50	67
2	8	30	50	50
5	8	30	50	29

[0080] Example 2 (both an edge and a center section are PET)
45mm extruder (the main extruder) was equipped with the gear pump, the preparations with which the main stratum of a laminating feed block is filled up were made, 30mm extruder (the 2nd extruder) was further equipped with the gear pump, and the preparations for restoration of an outer layer were made. In order that an outside melting layer might fill up the edge of a 480mm die with 0.8mm of die opening, PINORU within a feed block rotated 90 degrees to the direction set to the usual laminating extrusion.
[0081] SV value loaded the hopper of the main extruder with PET of 750, and the 2nd extruder was loaded with PET whose SV value is 750 too including the black color. Both performed extrusion at 285 degrees C. The throughput (discharge quantity) of the main extruder was 25.6 kg/h, and the throughput of the 2nd extruder was 8.2 kg/h. In order that the melting PET which came out of the die might form an amorphous sheet with a width of face of 430mm by 190 micrometers in thickness, it was controlled by 30 degrees C and cooled on the cooling roller using electrostatic impression contact printing. Since extrusion did not have discharge, it went on favorably (a melting sheet becomes discontinuous or, as for the time of an ununiformity, discharge takes place [thickness] too much).
[0082] The shift part uniform and stabilized in between for a transparent center section [edge / which the color attached to the obtained amorphous sheet black], had appeared. The width of face of the shift part was 11mm. Moreover, junction of an edge and a center section was excellent. the amorphism sheet containing one side of a black edge to 20x20cm sample — cutting off — batch type drawing equipment — [(bull KUNA KARO II(Bruckner Karo II)] was

used, and it extended by the ratio of 3.5x3.5 in 90 degrees C.) It was proved that junction of both polymers while extending is excellent.
[0083] Example 3 (both an edge and a center section are PET)
The same equipment for launching as an example 1 was used, and black PET which has SV of 664 for transparent PET with SV of 715 in a part for a center section was extruded at the edge, respectively. Extrusion and adhesion are favorable, it has the uniform thickness of 190 micrometers, and the amorphous sheet with good junction of a shift part was obtained. As a result of extending on the same conditions as an example 1, junction of an edge and a center section was excellent.
[0084] Example 4 (both an edge and a center section are PET)
The same equipment for launching as an example 1 was used, and black PET which has SV of 642 for transparent PET with SV of 900 in a part for a center section was extruded at the edge, respectively. Extrusion and adhesion are favorable and the amorphism sheet with good junction of a shift part was obtained. In a shift part, the thickness of a sheet was not so uniform (the edge was thick). As a result of extending on the same conditions as an example 1, especially in spite of junction of an edge and a center section having been hard to be extended from the thickness of an edge being different, it was excellent.
[0085] Example 5 (both an edge and a center section are PET)
The co-extruding method was applied on the continuation production line of a film. That is, the roll heated for the drawing of a lengthwise direction set one set, the tenter extended in a longitudinal direction, the thermoregulator, and the reel/cutting machine on the production line. The path of the main extruder of the used co-extrusion machine is the facility with which the laminating feed block containing PINORU which was equipped with the cutting edge for electrostatic impression with the die with a width of face of 1100mm by having 115mm and the lip gap whose paths of the 2nd extruder are 50mm and 0.6mm, and was shown in the example 1, and which rotated 90 degrees like is set. After extrusion, the sheet edge used PET which is distinguished easily and to which black coloring matter was added like, and the co-extrusion was performed under the various conditions shown in a table 2 (to this invention, an edge did not need to be stained but it used it only for the trial object). The width of face of each part of the obtained non-orientation sheet was as being shown in a table 2.
[0086]
[A table 2]

条件	吐出量（ｋｇ／ｈ）		ＰＥＴのＳＶ		シート各部の幅（mm）		
	主押出機	第２押出機	中央部	端　部	中央部	左側部	右側部
a	１２２	５０	６３７	７０８	５９１	８５	８４
b	８６	５０	６３７	７０８	５３０	１０８	１１０
c	６８	８０	６３７	７０８	４０８	１７０	１６７
d	１４０	１６	６４７	６８６	７２０	２６	２７
e	１１７	３３	６４７	６８６	６６３	５６	５６
f	６８	８０	６９９	６６１	３７５	２６５	２６０
g*	１４０	１６	６９９	６６１	８２５	５２	５３
h*	１１７	８０	６３７	７０８	５２４	１２８	１２８
i	１１７	６２	６９０	６４７	５３９	１０８	１０８

(*): Contiguity arrangement of the die was carried out at the cooling roller.
[0087] Extrusion was favorably carried [no] out to cases and the difficulty over adhesion to a revolution cooling drum was experienced. In all cases, the width of face of the shift part of an amorphism sheet was 15mm. The thickness of a shift part was very uniform.

[0088] It let it pass to the production line for obtaining the film which carried out biaxial orientation (drawing) of each obtained amorphism sheet, and heat-treated it. The drawing of a lengthwise direction was performed at 112 degrees C by the rate 3.5 of a drawing. The lateral drawing was performed at 97 degrees C by the rate 3.7 of a drawing. The extended film was heat-treated and cut at 230 degrees C, and was rolled round on the roll.
[0089] In all cases, junction of an edge and a center section was excellent. Fracture temperature preparation inside the plane did not take place in the tenter, but the drawing was uniform. The stability of an edge is excellent, it is possible to cut a film from a shift part within 1mm, and a cutting edge did not enter into coloring eclipse ****** black at that time.
[0090] Example 6 (for an edge, a PEN center section is PENBB)
In this example, the width of face of a die was 280mm, and also the same extruder as an example 1 was used. PENBB was used for the center section (the main extruder), PEN was used for the edge (the 2nd extruder), and the co-extrusion was performed. SV is 728 and used PENBB added 0.6% of the weight of the silica particle. SV is 741 and PEN did not add a particle. Both the polymers of the temperature of an extruder are 285 degrees C, and the temperature control of the die was carried out to 300 degrees C.
[0091] The obtained sheet had thoroughly the junction nature in which those with ****** and both polymers were excellent in the center section and both ends of a sheet. The width of face of a center section (PENBB containing a silica particle) was 137mm, and each width of face of an edge (PEN) was 37mm and 31mm. The thickness of the center section of the sheet was 90 micrometers. The thickness of the lateral part of an edge was about 230 micrometers by the feeding neck from a die. In spite of having this big thickness, this lateral part is still amorphism ********.
[0092] Subsequently, it let it pass on the continuation biaxial drawing equipment line with a combination same type as having indicated the above-mentioned amorphism PENBB/PEN sheet in the example 4. The drawing was taken as the drawing temperature of 130 degrees C, and draw magnification 4.5 also with the lengthwise direction and the longitudinal direction. Heat treatment was performed at 240 degrees C. The productivity of a biaxial drawing was excellent. In spite of having used a chemically different polymer, in the shift part, the fracture by the stress of a tenter or heat treatment did not take place. Therefore, it was shown that junction of a center section and the both ends of a film is excellent.
[0093] The example 1 (PENBB monolayer film) of a comparison
The same PENBB as having used the extruder of the diameter of 45mm and having used it in the example 6 was extruded through the 280mm die on the cooling roller equipped with electrostatic impression contact printing (the wire method). Temperature setting out was made the same as an example 6. The width of face of the obtained PENBB sheet was 207mm. Although the thickness of a center section was about 90 micrometers, in the outside part (from an edge to about 2mm), both sides was [thickness] 200 micrometers or more by the feeding neck from a die. The center section of the sheet adhered to the cooling roller thoroughly in the part of the outside where amorphism ******** is thick, and crystallization took place. The crystal part was opaque white and weak. It let the same continuation production line as the obtained PENBB sheet having been shown in the example 6 pass. However, since fracture of the lengthwise direction which begins from the crystallized weak edge often took place, productivity was very bad.
[0094] an example 7 <manufacture of polyester> -- first, while taking and carrying out heating temperature up of dimethyl 2, the 6-naphthalene dicarboxy rate 47.5 section, dimethyl 4, the 4'-diphenyl dicarboxylic acid 52.5 section, the ethylene glycol 51 section, and the magnesium acetate 4 monohydrate 0.1 section to the reactor, the methanol was distilled off, the ester exchange reaction was performed, 4 hours was required from reaction initiation, temperature up was carried out to 230 degrees C, and the ester exchange reaction was ended substantially.
[0095] Subsequently, the ethylene glycol slurry of the silica particle of 1.4 micrometers of mean diameters was added. After slurry addition, the triphenyl phosphate 0.096 section and the antimony-trioxide 0.035 section were added further, and the system of reaction was gradually considered as reduced pressure, and temperature was raised gradually, it considered as 290

degrees C, the polycondensation reaction was performed for 4 hours, and the polyester of limiting viscosity 0.58 was obtained. The content of the silica particle in the obtained polyester was 0.3 % of the weight.
[0096] Solid state polymerization of the chip of the obtained polyester was carried out under the vacuum at 240 more degrees C for 15 hours, and polyester (A) was obtained. The melt viscosity of the obtained polyester (A) was 10000poise in 300 degrees C.
[0097] Moreover, the dicarboxylic acid component of a start raw material was made only into dimethyl 2 and the 6-naphthalene dicarboxylic acid 95 section, except not adding a silica particle, like the above, polyethylene 2 and 6-naphthalate were obtained and this was made into polyester (B). The melt viscosity of polyester (B) was 8200poise in 300 degrees C.
[0098] It was made to join so that the obtained polyester (A) and (B) are dried with a conventional method, respectively, melting extrusion is carried out with the extruder of each **, polyester (A) may serve as a center section of the sheet and polyester (B) may serve as both ends of a sheet, and extruded from the mouthpiece. The ratio of the extrusion outlet of polyester (A) and polyester (B) was taken as the 95 sections / 5 section. Moreover, at the process which cools the sheet by which melting extrusion was carried out, electrostatic seal-of-approval contact printing was adopted.
[0099] It checked that the extrusion outlet of polyester (B) was controlled few and polyester (B) was not mixing it inside 5% of both ends to full [of the obtained sheet] by measurement of DSC and NMR. In addition, the thickness of a sheet was 400 micrometers in the thickest parts of 35 micrometers and an edge in the center section. When crystallization was prevented covering full and the obtained sheet extended this, fracture etc. did not take place.
[0100] Using the raw material which mixed the polyester (B) manufactured in the example 1 with scraps generated in the example 8 example 7 at the time of oriented film manufacture, such as a handle part, at 50/50 of a rate as a raw material for sheet both ends, the center section manufactured the sheet like the example 1 as polyester (A). It checked that polyester (B) was not mixing inside 10% of both ends to full [of a sheet]. The thickness of a sheet was 480 micrometers in the thickest parts of 45 micrometers and an edge in the center section. Also in this case, crystallization was prevented covering a sheet full, and when extending this, fracture etc. did not take place.
[0101] Melting extrusion of the polyester (A) manufactured in the example of comparison 2 example 7 was carried out, and the sheet was manufactured. Since the edge of a sheet was thick, crystallization could not fully be prevented, but when the obtained sheet was extended at the vertical drawing process, fracture of a film occurred frequently and productivity fell remarkably. Moreover, in order to prevent crystallization, the electrostatic seal-of-approval electrode had to be set as very strong conditions, the problem on which discharge occurs frequently was also produced, and this also caused a remarkable productivity slowdown.
[0102] In example of comparison 3 example 7, 300-degree C melt viscosity used the polyethylene terephthalate of 1000poise(s) as resin which constitutes sheet both ends. Although crystallization of a sheet edge was able to be prevented, when carrying out the vertical drawing of the obtained sheet, the sheet edge caused adhesion between hot calender rolls beforehand, and the drawing trouble was often caused.
[0103] the same presentation as the polyester (A) in example of comparison 4 example 7 — and melt viscosity — the polyester (C) of 6000poise(s) — a center section — carrying out — the same presentation as polyester (B) — and melt viscosity made the polyester (D) of 10000poise (s) both ends, and manufactured the sheet by making an extrusion outlet ratio into the 70 sections / 30 section. In this case, although the high crystallinity and high thermal-resistance film which are one of the objects of this invention were able to be manufactured, since polyester (D) existed in less than 20% of edges to sheet width of face, the yield was bad and productivity was inferior.
[0104] In addition, each DSC measurement result of the resin of the center section and both ends of each sheet which were obtained in examples 7 and 8 - the examples 2-4 of a comparison is collectively shown in a table 3.
[0105]

[A table 3]

	位　置	DSC測定結果（℃）		
		Tm	Tc	ΔTmc
実施例７	中央部 両端部	２８０ ２６５	２４４ ２０４	３６ ６１
実施例８	中央部 両端部	２８０ 260/270	２４４ ２１０	３６ ５０
比較例２	中央部 両端部	２８０ ２８０	２４４ ２４４	３６ ３６
比較例３	中央部 両端部	２８０ ２５６	２４４ １９４	３６ ６２
比較例４	中央部 両端部	２８０ ２５６	２４５ １９２	３５ ６４

[0106]
[Effect of the Invention] According to this invention explained above, the cost of a manufacturing cost, the thermoplastics sheet which uses an expensive polymer especially, or film manufacture is reduced substantially, and the workability of the film under manufacture and after manufacture is improved substantially. And when manufacturing a crystalline thermoplastics sheet or a film according to the desirable embodiment of this invention, in the process which manufactures the non-crystallized sheet of thermoplastics with a quick crystallization rate, fracture at the process which carries out drawing processing of the obtained sheet etc. can be prevented by preventing crystallization of both ends. Therefore, the productivity of the oriented film of high crystallinity thermoplastics can be raised remarkably.

[Translation done.]

* NOTICES *

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The cross-section explanatory view of the thermoplastics film which has the thick edge manufactured by the method of co-extruding this invention
[Drawing 2] Approximate account drawing of the conventional extrusion system which has a pivotable sleeve object (pinole) and which manufactures a layered product by the co-extruding method
[Drawing 3] It is approximate account drawing of the same extrusion system as the conventional extrusion system except having rotated the sleeve object 90 degrees, in order to manufacture the film of this invention.
[Drawing 4] The partial flat-surface explanatory view of three conventional dies juxtaposed in order to manufacture the film of this invention using different equipment from drawing 3

[Translation done.]

* NOTICES *

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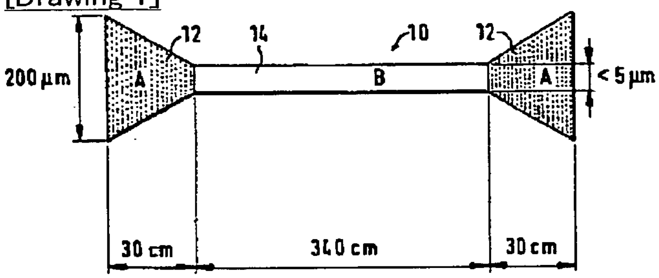
damages caused by the use of this translation.

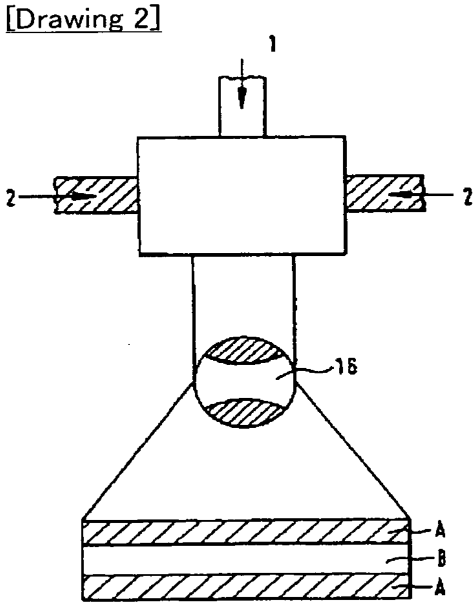
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

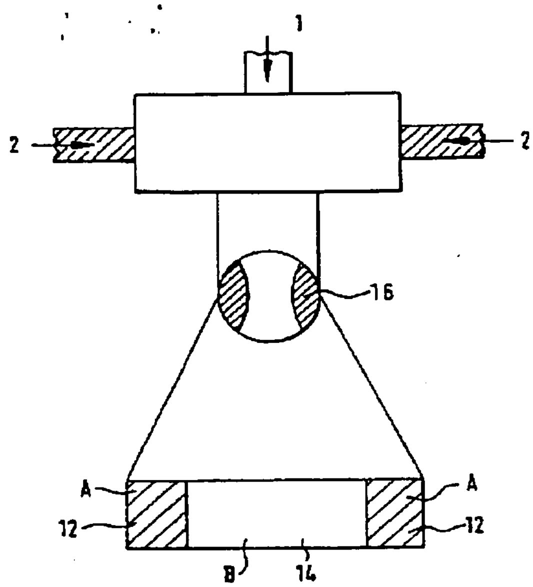
[Drawing 1]



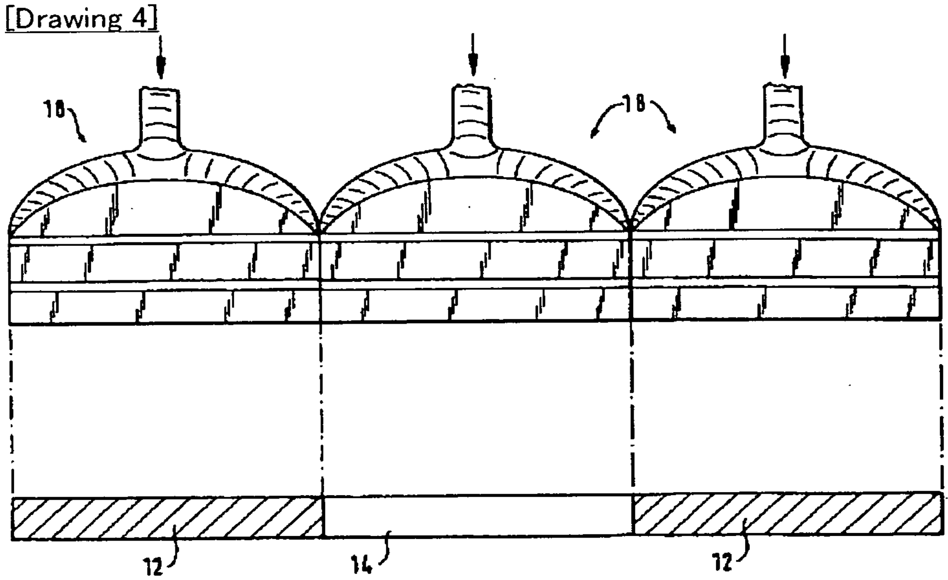
[Drawing 2]



[Drawing 3]



[Drawing 4]



[Translation done.]